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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/870,085

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Hiroyuki Yano

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03/24/2003

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 03/24/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/870,085

Applicant(s)

YANO ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 23-33 is/are pending in the application.
- 4a) Of the above claim(s) 5, 6, 23-26 and 31-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 27-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-144) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action responds to Applicant's Election in Paper No. 10 dated 12/09/02.

Election/Restrictions

1. Claims 5-6, 23-26 and 31-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 10.
2. Applicant's election without traverse of claims 1-4 and 27-30 in Paper No. 10 is acknowledged.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 3 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

- With respect to claim 3, "at least one additional step, which is included in the manufacturing steps of the semiconductor device, following forming a deep irregular uneven portion in the target substrate" renders the claim indefinite.

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It is not clear what "at least one additional step" actually is. More particularly, what are details of that step?

- With respect to claim 30, line 6, it is not clear where a polysilicon film is deposited.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-3, as being best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Black et al [US 6,265,314].

- With respect to claim 1, Black et al, figs 1-6's and col 1-6, discloses a method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate (14, figs 6's) to keep a diameter of said semiconductor substrate substantially unchanged.
- With respect to claim 2, Black et al, fig 2-3 and 6A, discloses that selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate is carried out after forming a deep and irregular uneven portion (26, col 3 lines 11-18) in the peripheral portion and the beveled portion (20) of the target substrate (14).
- With respect to claim 3, Black et al discloses that selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate is carried out after at least one additional step (setting process parameters, col 4 lines 32-47) which is included in the manufacturing steps of the semiconductor device following forming a deep and irregular uneven portion (26, col 3 lines 11-18) in the target substrate (14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted prior Art (APA) in view of Black et al [US 6,265,314].

APA, figs 1's and specification pages 1-6, discloses a method of manufacturing a semiconductor device comprising steps of:

applying an anisotropic dry etching treatment to form a deep and irregular uneven portion (7, fig 1A, text page 4 lines 4-17) in the peripheral portion and the beveled portion of the target substrate (1) *[claims 2 and 27]* wherein the anisotropic dry etching treatment is carried out so as to form a trench capacitor in the semiconductor substrate (1) *[claims 28-29];*

covering the main surface of the target substrate with a resist film (4', fig 1B) after forming the deep and irregular uneven portion (7) in the target substrate (1) *[claims 3-4]*.

APA does not teach selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate to keep a diameter of said semiconductor substrate substantially unchanged *[claim 1]*.

Black et al, figs 1-6's and col 1-6, teaches selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate (14, figs 6's) to keep a

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diameter of said semiconductor substrate substantially unchanged to remove defects (26) in the peripheral portion and the beveled portion of the target substrate.

Therefore, it would have been obvious for those skilled in the art to modify the process of APA by selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate as being claimed, per taught by Black et al, to remove defects in the peripheral portion and the beveled portion of the target of substrate for reducing contaminations which adversely effect semiconductor device.

6. Claim 30, as being best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al [US 6,265,314] as applied to claim 1 above, in view of Jenq [US 5,795,804].

Black et al substantially discloses the claimed method including selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of a target substrate including a semiconductor substrate (14, figs 6's) to keep a diameter of said semiconductor substrate substantially unchanged.

Black et al does not expressly teach: forming an insulating film on the semiconductor substrate; applying an anisotropic etching to the insulating layer and the semiconductor substrate so as to form a trench in the semiconductor substrate; and depositing a polysilicon film in the trench followed by said selectively grinding or polishing. Black et al just generally discloses that said selectively grinding or polishing is carried out after forming a capacitor.

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However, Jenq (figs 1-10 and col 1-8 particularly col 3 lines 10-42 and col 6-8) discloses forming a capacitor by: forming an insulating film (24, fig 1) on the semiconductor substrate; applying an anisotropic etching to the insulating layer and the semiconductor substrate so as to form a trench (5, fig 2, col 6 lines 6-21 and col 3 lines 10-42) in the semiconductor substrate; and depositing a polysilicon film (28, fig 3-12) in the trench for forming the capacitor in the trench.

Therefore, it would have been obvious for those skilled in the art to modify the process of Black et al by forming the insulating film, applying the anisotropic etching and depositing the polysilicon, as being claimed, per taught by Jenq to form the trench capacitor as a design being needed in a chip of semiconductor device and then selectively grinding or polishing the peripheral portion and the beveled portion on the main surface side of the target substrate to remove defects (26) out of the target substrate after forming the capacitor for reducing contamination in semiconductor device.

Response to Arguments

7. Applicant's arguments with respect to claims 1-4 and 27-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

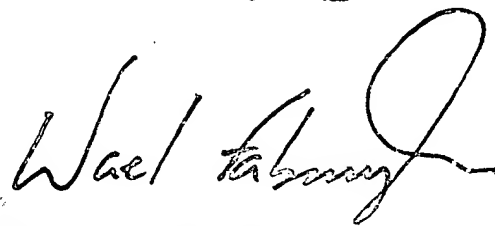
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (703) 308-6172. The examiner can normally be reached on Monday-Thursday 8:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-3432 for regular communications and (703) 308-7725 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thanhha Pham
March 18, 2003

A handwritten signature in black ink, appearing to read "Wael Tabany". The signature is fluid and cursive, with a large loop at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800